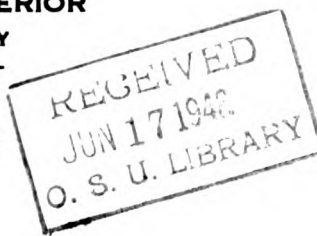


UNITED STATES  
DEPARTMENT OF THE INTERIOR  
J. A. KRUG, SECRETARY

BUREAU OF MINES  
JAMES BOYD, DIRECTOR



INFORMATION CIRCULAR

BLAST-HOLE DRILLING WITH DIAMOND DRILLS AT THE  
TENNESSEE COPPER CO. MINES, DUCKTOWN, TENN.



BY

WILLIAM A. BECK

I. C. 7452,  
May 1948.

## INFORMATION CIRCULAR

### UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

#### BLAST HOLE DRILLING WITH DIAMOND DRILLS AT THE TENNESSEE COPPER CO. MINES, DUCKTOWN, TENN.<sup>1/</sup>

By William A. Beck<sup>2/</sup>

#### INTRODUCTION AND SUMMARY

This paper is one of a series describing current practice in diamond drilling for production at various mines throughout the United States. It describes the drilling and blasting methods used at the Tennessee Copper Co., which started using deep-hole drilling for blasting in 1927, employing independent, rotation percussion drills with sectional drill steel. Since 1942 the company has employed diamond drills for deep-hole drilling. This method has now passed the experimental stage and promises to become permanent.

The elimination of rock dust and safer working conditions for the drill crews are listed as the main advantages. The higher initial cost of equipment is the principal disadvantage.

#### ACKNOWLEDGMENTS

Acknowledgment is expressed to the following officials of the Tennessee Copper Co. for their aid in preparing this paper: C. H. McNaughton, general superintendent; Lamar Weaver, superintendent of mines; H. F. Kendall, assistant superintendent of mines; J. H. Ffolliott, mining geologist; Clarence F. Seaman, safety and ventilation engineer; and Hoyt Taylor, stope foreman.

#### LOCATION AND TOPOGRAPHY<sup>3/</sup>

The Ducktown mining district, in which the Tennessee Copper Co. mines are located, lies in the Blue Ridge region of Tennessee in the southeast corner of the State immediately north of the Georgia State line. It is bounded on the east by the Pack Mountains, on the north by the Stansbury Mountains, and on the northwest by the Little Frog Mountains and so occupies a basinlike position, although it is a dissected plateau with an average altitude of about 1,600 feet. The principal stream of the region is the Ocoee River, which flows in a northwesterly direction into the Hiwassee River, which in turn empties into the Tennessee.

---

<sup>1/</sup> The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is made: "Reprinted from Bureau of Mines Information Circular 7452."

<sup>2/</sup> Mining engineer, Bureau of Mines.

<sup>3/</sup> Ross, Clarence S. Origin of the Copper Deposits of the Ducktown Type in the Southern Appalachian Region: Geol. Survey Prof. Paper 179, 1935, p. 95.

HISTORY OF DUCKTOWN DISTRICT<sup>4/</sup>

In 1843, while panning the outcrop at the Burra Burra lode for gold, a prospector named Lemmons discovered metallic minerals. This discovery was not followed up, however, and no systematic exploration was undertaken until 1847, when A. H. Weaver obtained a lease to exploit the Hiwassee property on the deposit now known as the Burra Burra lode.

Most of the deposits were marked by well-defined gossans, and before 1855 all the deposits in the Tennessee portion of the district had been discovered.

Mining was carried on by numerous small companies until 1897, when extensive drilling of the Burra Burra and London lodes was begun; as a result of these operations, the Tennessee Copper Co. was organized in 1899. It obtained by purchase the Burra Burra, London, Eureka, Boyd, and Culchote mines and by lease the Polk County mine and the Old Tennessee property. Since then it has acquired the Calloway and Mary mines and several other properties.

Production today is from the Burra Burra, Eureka, Calloway, and Boyd mines. The Boyd mine is the latest development and promises to be one of the largest producers.

GEOLOGY<sup>5/</sup>

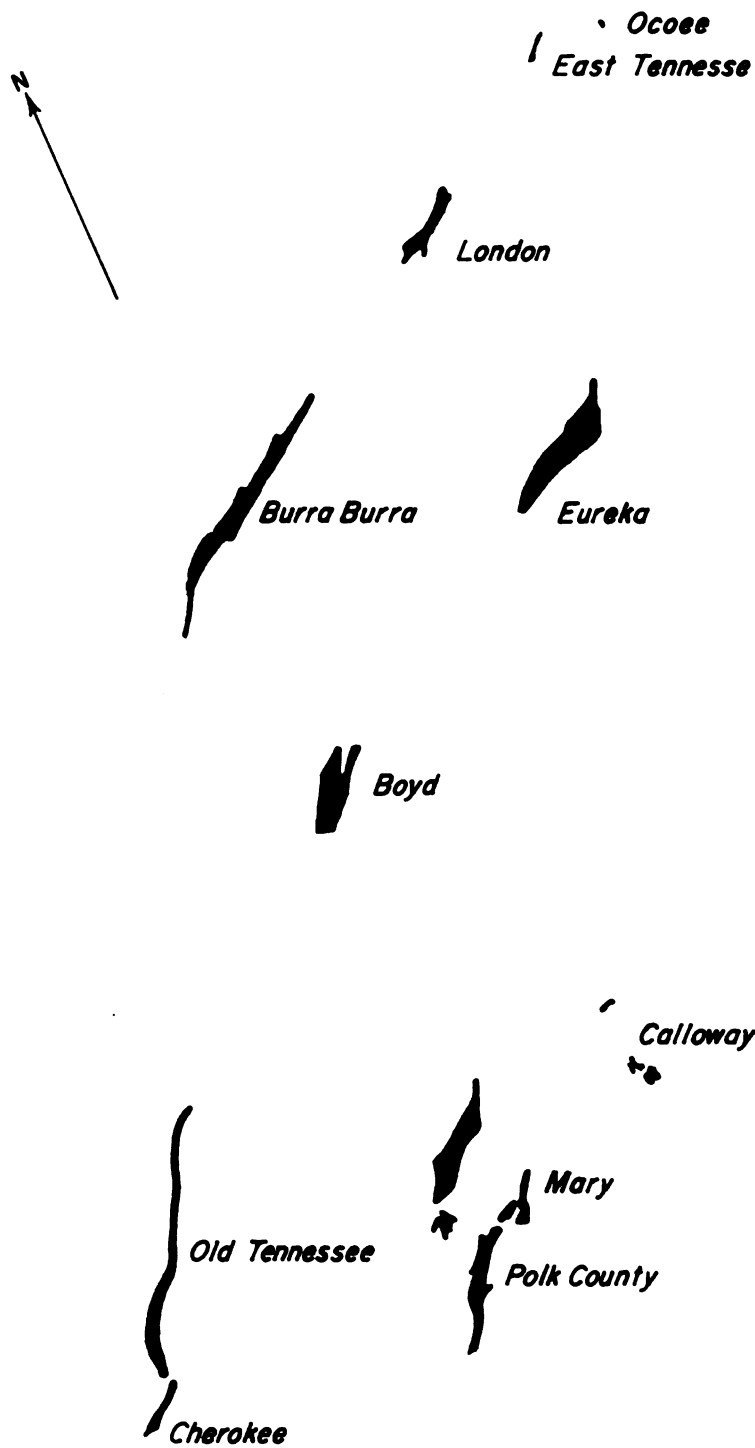
The rocks of the district are considered to be of lower Cambrian age and are a part of the Great Smoky formation, consisting mainly of interbedded graywacke and mica schist, in which the ore deposits occur. The ore bodies are included in an area of about 6 square miles - 2 miles wide and 3 miles long - striking N. 45° E., and may be grouped into three general lode systems. The northeast system, including the East Tennessee, London, and Burra Burra ore bodies, and the southeast group, comprising the Polk County, Mary, and Calloway deposits, all are characterized by relatively high copper values. The ores of the central system, which includes the Eureka, Boyd, Old Tennessee, and Cherokee ore bodies, are low in copper and high in total sulfide content.

Boyd mine lies roughly halfway between the Old Tennessee and Eureka ore bodies and 2,500 feet in the hanging wall of the Burra Burra mine (fig. 1). Elevation of the surface is about 1,725 feet above sea level. Surface showings are limited to narrow bands of iron-stained schist and, in a few places, a scattering of gossan float over a strike length of 1,000 feet. The ore body, dipping steeply southeast, strikes N. 25° to 40° E. It varies from a narrow, leanly mineralized vein near the surface to a massive sulfide body over 300 feet wide at the tenth level elevation (850 feet above sea level and approximately 850 feet below surface).

The ore is massive sulfide, with a few inclusions of rock or barren vein matter. Mineralogically, the ore consists of pyrite, pyrrhotite, sphalerite,

<sup>4/</sup> Work cited in footnote 3.

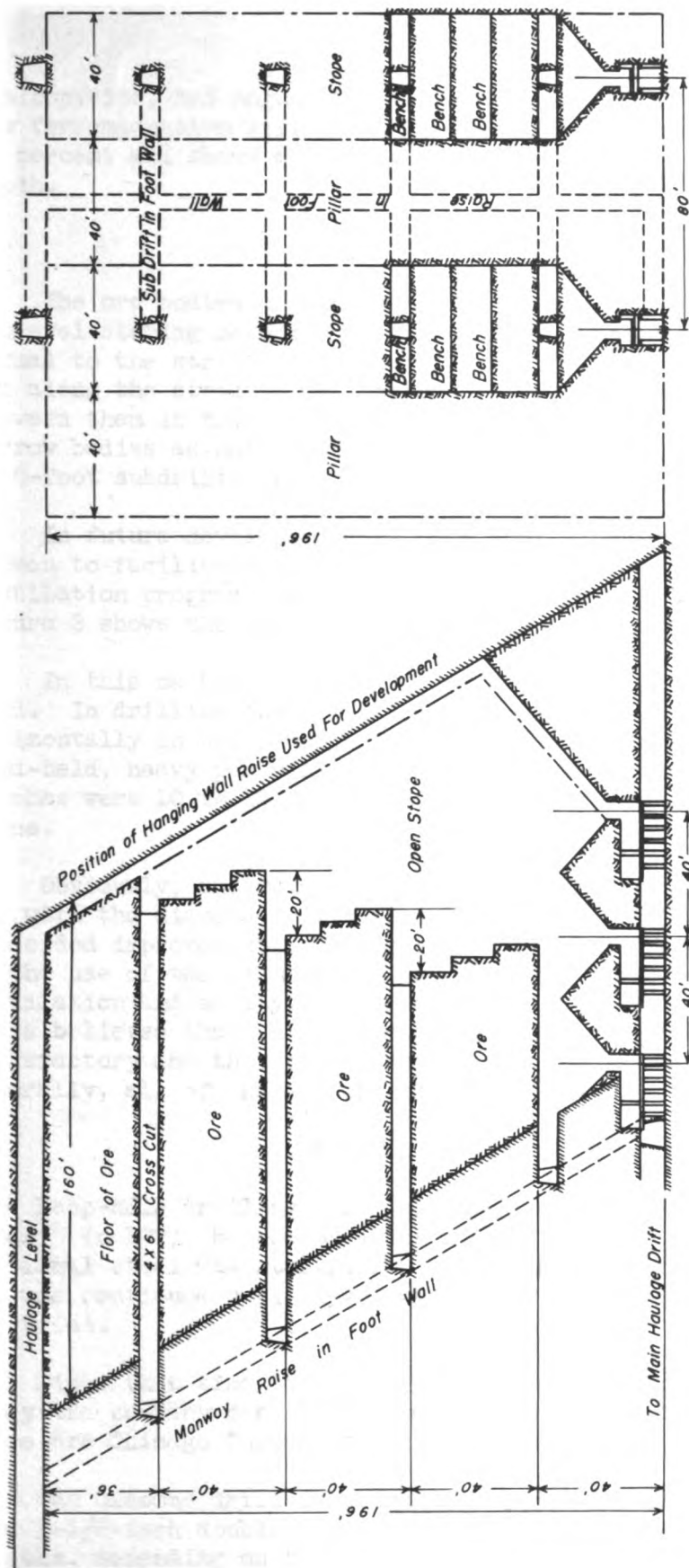
<sup>5/</sup> Ffolliott, J. H., Exploration and Development of Boyd Mine: Am. Inst. Min. and Met. Eng., Tech. Pub. 1493, vol. 6, September 1942, pp. 1-12.



After J. H. Ffolliott.



Figure 1. - Ore bodies near Ducktown, Tenn.



OLD MINING METHOD AS APPLIED  
TO WIDE ORE BODIES  
TENNESSEE COPPER COMPANY

Figure 2

chalcopyrite, and magnetite, associated with quartz, calcite, mica, and various ferromagnesium silicates. The total sulfide content of the ore exceeds 75 percent and shows a tendency toward increased total sulfide content with depth.

### MINING METHODS

The ore bodies of the Tennessee Copper Co. are laid out for mining by the sublevel stoping method. In the wide ore bodies, the stopes are laid out normal to the strike of the deposit, while in the narrow ones they are laid out along the strike. The stopes are 70 feet wide, with 40-foot pillars between them in the wide ore bodies, while occasional pillars are left in the narrow bodies as safety dictates. Haulage levels are 200 feet apart, and 4- by 6-foot subdrifts are driven at 40-foot intervals between haulage levels.

In future development, 8- by 8-foot subdrifts and subcrosscuts will be driven to facilitate the diamond-drilling program. This will also aid the ventilation program, which has not been entirely satisfactory in the past. Figure 2 shows the old mining method as applied to wide ore bodies.

In this method of mining, percussion drills using sectional steel were used. In drilling the first bench at the sublevel, the round was drilled horizontally in the bench. The benches below were removed by drilling with hand-held, heavy percussion drills known at the mine as "Bull Mooses." These benches were 10 to 12 feet thick, and the round was drilled in a vertical plane.

Obviously, the future mining program planned, which calls for stope drilling with the diamond drills from 8- by 8-foot subdrifts and crosscuts, will be a decided improvement. The increased size of the working drift necessitated by the use of the diamond drills will afford the added advantages of better ventilation and safety, as men will no longer have to drill in the open stope. It is believed that the new proposed round as outlined in figure 7 will be satisfactory and that no difficulty will be encountered with remaining pillars. Naturally, all of these items should tend to decrease mining costs.

### BLAST-HOLE DIAMOND DRILLING

Deep-hole drilling for blasting is not new in the Tennessee Copper Co. mines. In 1927 the use of independent, rotation percussion drills employing sectional steel was started for drilling blast holes for production. Their use was continued until 1942, when the first diamond drill for this purpose was tried.

Since that time diamond drilling has been in the development stage, and today the company has 16 air-operated diamond drills in operation. Eight of these are Chicago Pneumatic C. P. 5's, and eight are Sullivan H. S. 15's.

The diamond drill is mounted on a 3-1/2-inch column arm, which is attached to a 3-1/2-inch double screw column. The columns and arms are of various lengths, depending on the room available at the point of setup. An EX concave

noncoring bit, which drills a 1-1/2-inch hole, is used except where hard rock is encountered, when a coring bit is used. When the bits become worn, they are returned to the manufacturer for salvage. Drills are operated at 3,000 to 4,000 r.p.m., with 85 pounds air pressure at the machine. Owing to the close quarters in which drilling is done, 2-foot lengths of rod are used.

During 1945, in drilling approximately 60,000 feet of hole, the average life of a bit was 163 feet for 370 bits. Each bit contains 10 to 11 carats, and there are 10 to 15 stones to a carat. The cost per carat is about \$6.00. During the second quarter of 1946, the average cost of bits per foot of drilling was \$0.19. Round-faced and square-faced Pilot bits were tried and found too fragile for inexperienced drill runners.

#### METHOD OF DRILLING AND BLASTING

During the development of diamond drilling in the mines, several methods of placing the holes were tried. Figures 3 to 6 show some of these with comments on how they broke. As all subdrifts and subcrosscuts are but 4 by 6 feet, it is necessary to slab them off at the entrance to the stopes in order to get drilling room as shown in figure 6. Rounds shown in figures 3, 4, and 5 were drilled from benches that had to be cut before rounds could be drilled.

In future developments all subdrifts and subcrosscuts will be 8 by 8 feet, and all rounds will be cut as shown in figure 7. No benching will be done, and all holes will be drilled from the crosscuts or drifts. The holes are fanned out from the drill site; the fans are at 4-foot intervals and the holes so placed that their points are no farther than 9 feet apart. No holes are drilled with upward inclination. Some studies of drifting have been made on the holes drilled in the nearly horizontal plane, as it was thought that the short drill rods might permit considerable deflection. However, the results of these studies indicate that no serious deflection resulted. Fourteen holes will be drilled from each drift or crosscut set-up.

Blasting is done with 60-percent special gelatin in 1-1/4- by 12-inch cartridges. Detonation is by Primacord, which is attached to the second cartridge from the collar of the hole. Clay tamping, in paper sacks, is used.

As diamond drilling was considered in the development stage, very few actual records were kept previous to January of this year.

Tables 1 to 12 show the tonnage, footage, and cost records from the Boyd and Eureka mines for six 4-week periods from January 1, 1946, to June 15, 1946. These costs do not include maintenance or repair costs on the drills. Upkeep costs on the drills have been about \$0.02 per foot drilled to date.

In the tables, bonus drilling is the daily rate or company account plus \$0.021 per ton of ore broken. "Foot" drilling is a contract rate per foot of hole drilled and is used mostly in clean-up work where appreciable tonnage cannot be broken.

It is expected that these drilling costs will be reduced as the drillers gain experience.

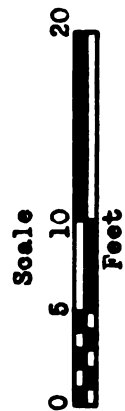
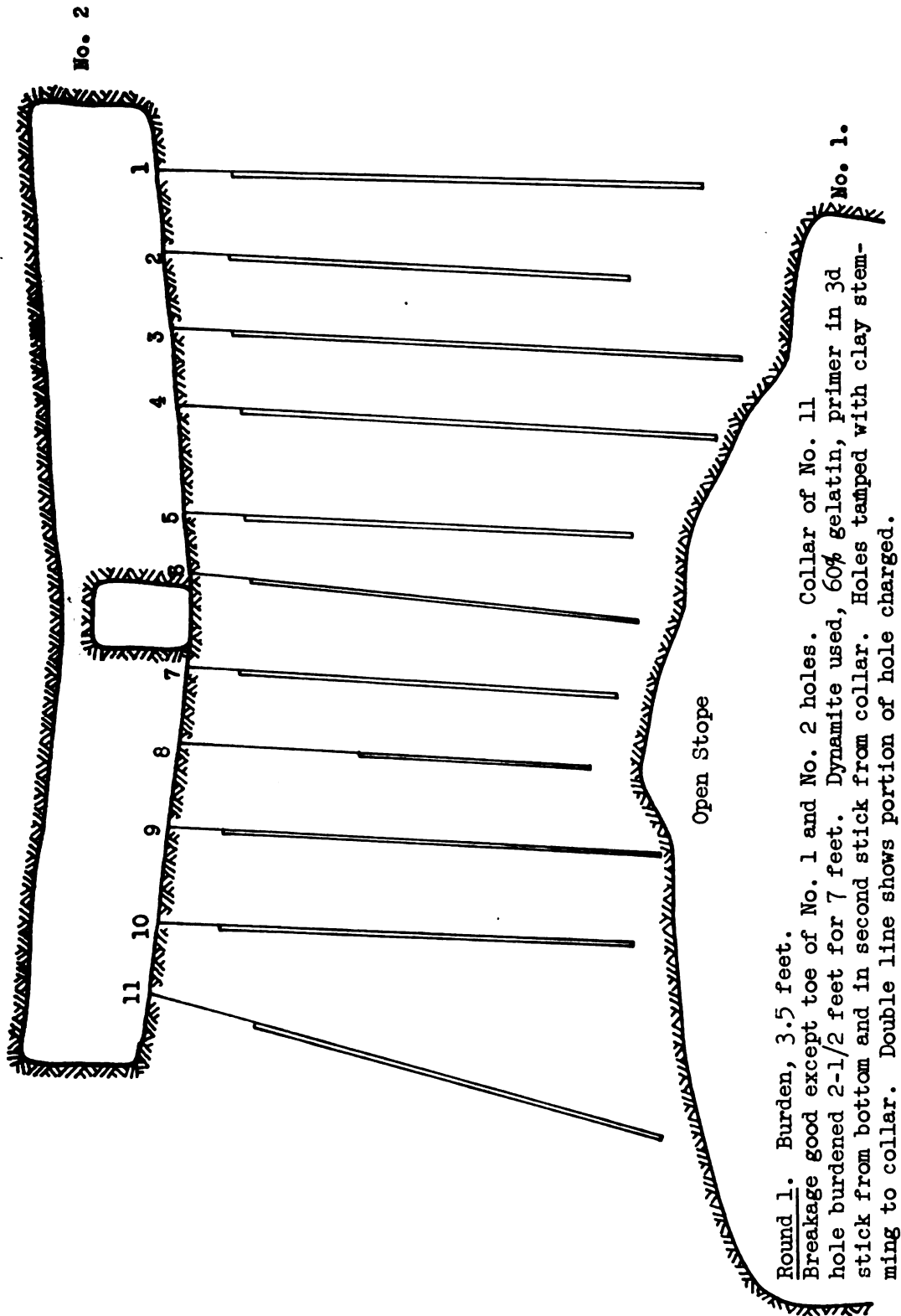


Figure 3. - Section facing hanging wall.

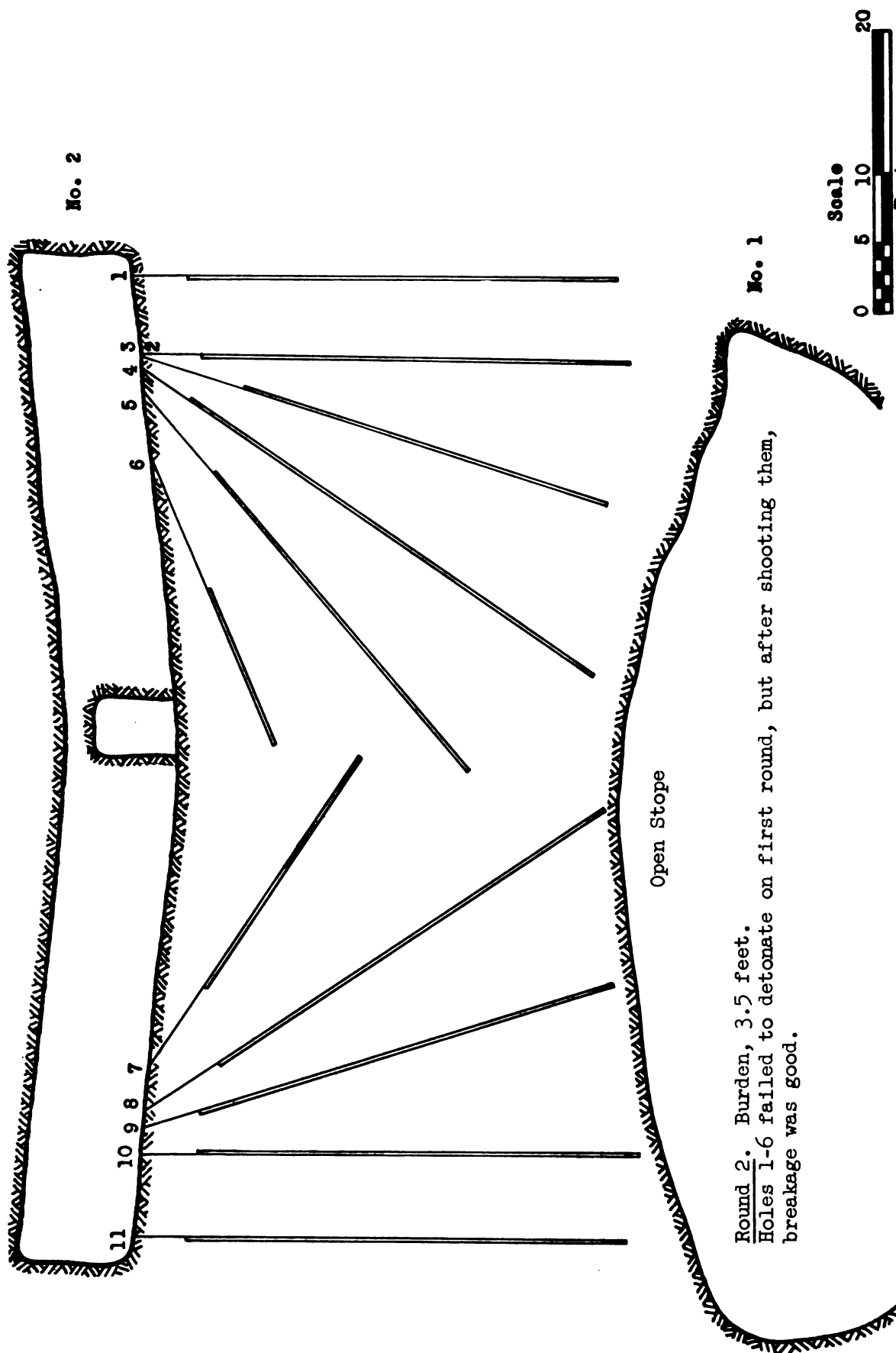
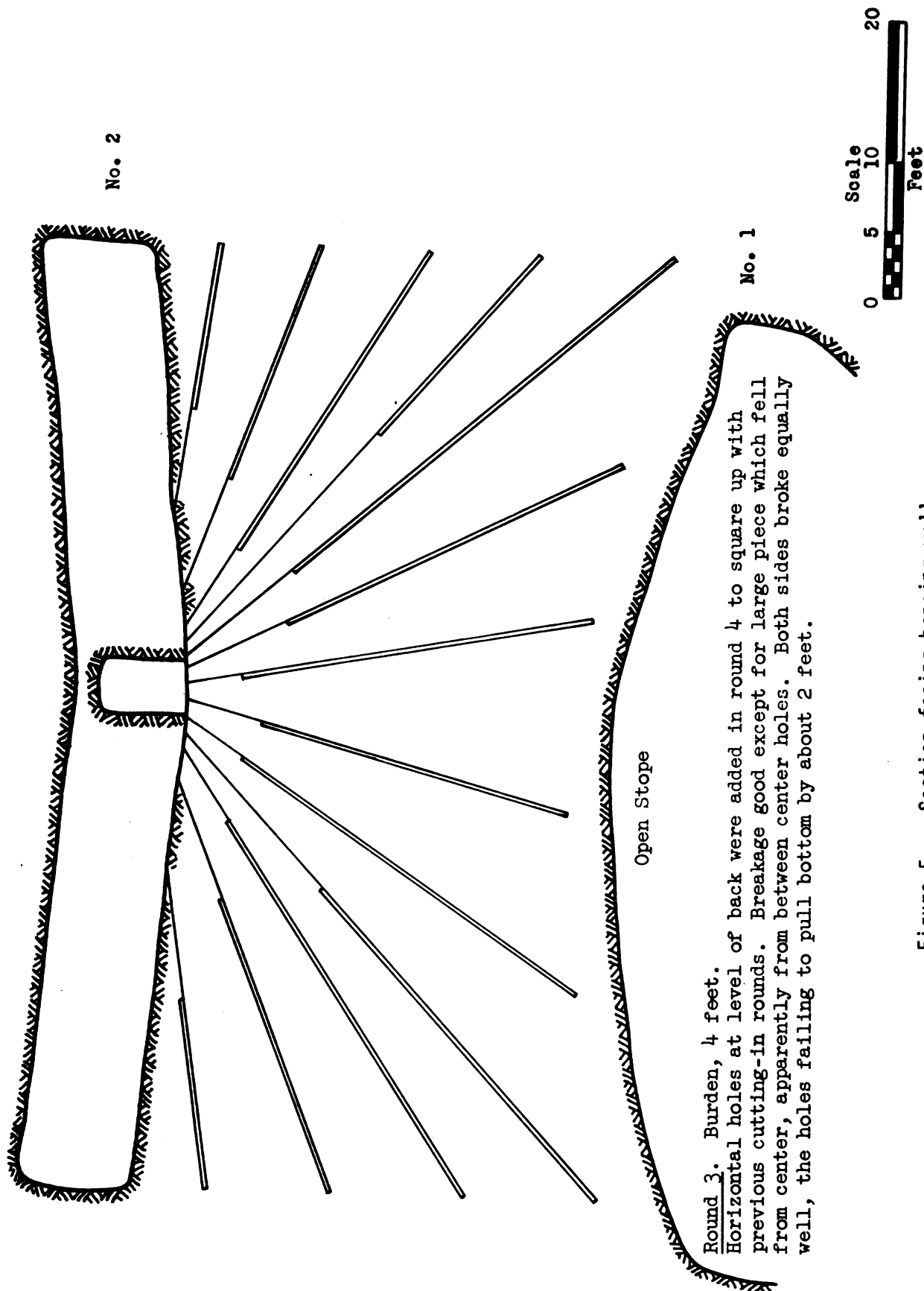


Figure 4. - Section facing hanging wall.



Round 3. Burden, 4 feet.

Horizontal holes at level of back were added in round 4 to square up with previous cutting-in rounds. Breakage good except for large piece which fell from center, apparently from between center holes. Both sides broke equally well, the holes failing to pull bottom by about 2 feet.

Figure 5. - Section facing hanging wall.

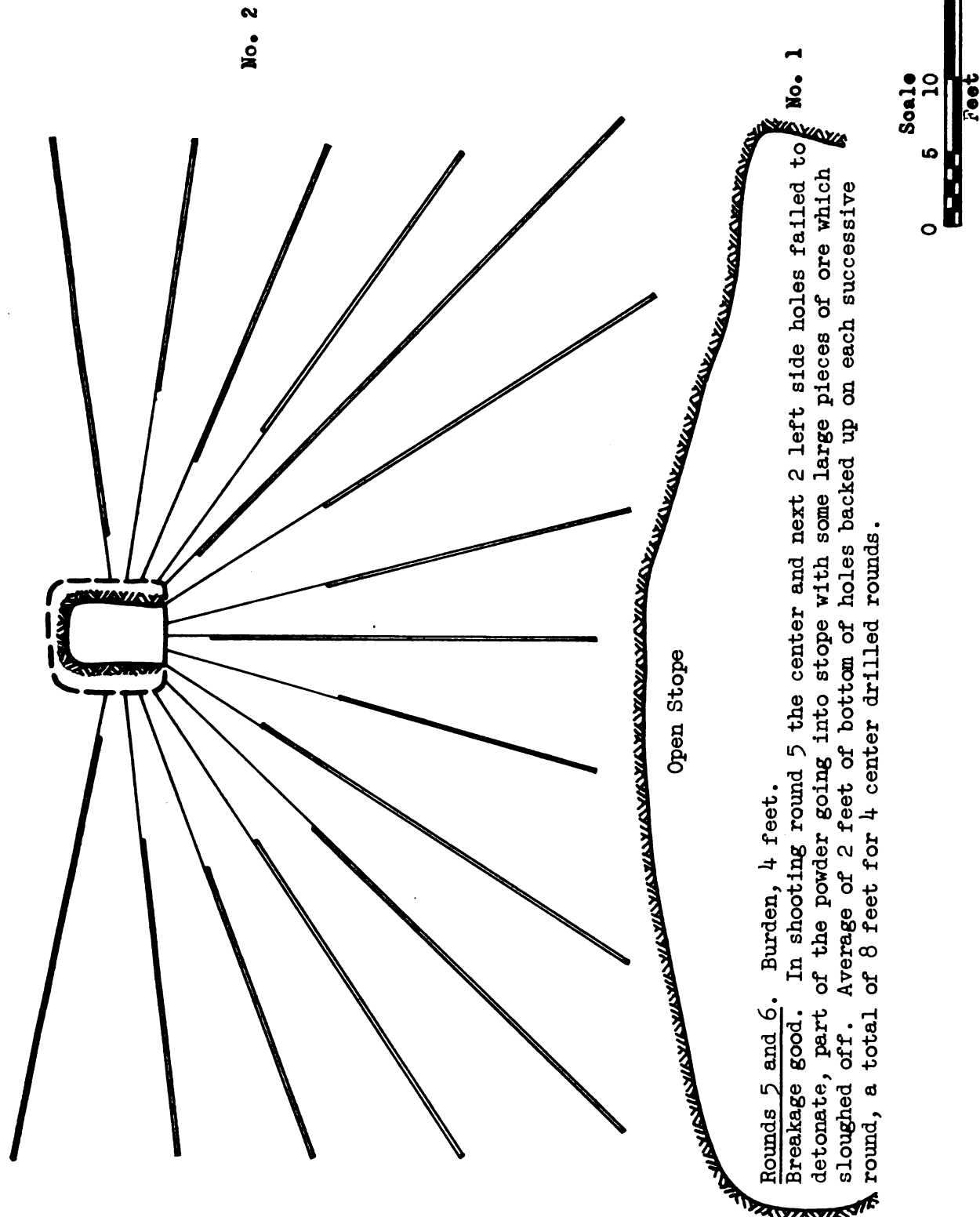


Figure 6. - Section facing hanging wall.

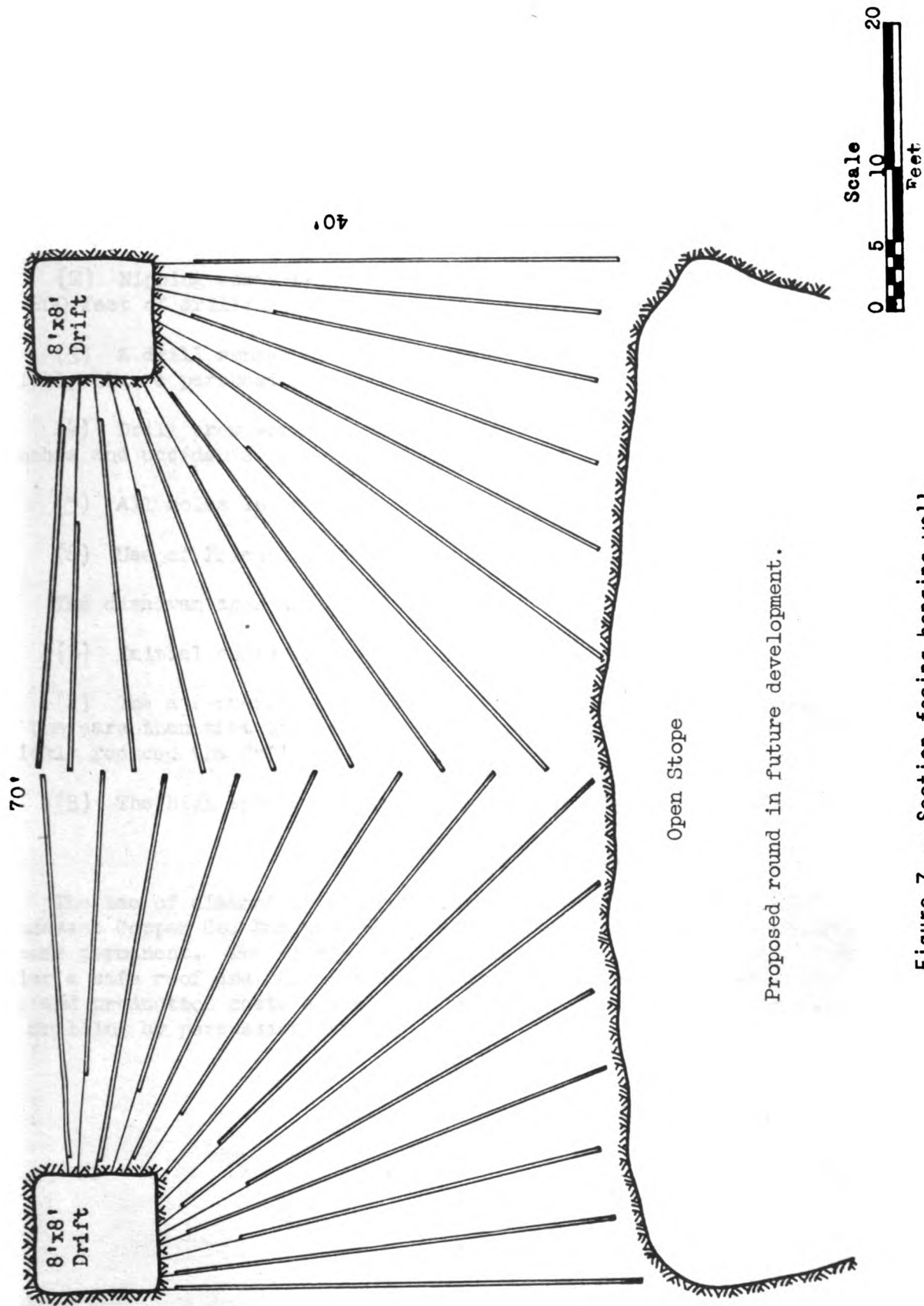


Figure 7. - Section facing hanging wall.

## ADVANTAGES AND DISADVANTAGES

The advantages of diamond drilling over percussion drills for production at the Tennessee Copper Co. mines are:

- (1) It completely absorbs the bit-cuttings in the circulation water.
- (2) Nipping costs have been reduced. One bit can be used for 150 feet to 200 feet of drilling.
- (3) A drill runner can be trained to run a diamond drill much more quickly than a percussion drill.
- (4) Drill crew works in a safe place. Danger of men falling from the benches and accidents from rolling and falling rocks have been greatly reduced.
- (5) All holes in one fan can be drilled from one or two set-ups.
- (6) Use of Primacord gives better breakage and is safer.

The disadvantages are:

- (1) Initial costs of the machine and equipment is greater.
- (2) The air-operated diamond drills make a noise that is more irritating to the ears than that of percussion drills. Mufflers were tried, but ice quickly reduced the drilling speed.
- (3) The high speeds of the diamond drills are a little more hazardous.

## CONCLUSIONS

The use of diamond drills for blast-hole drilling at the mines of the Tennessee Copper Co. has passed the experimental stage and now promises to become permanent. The elimination of dust and the added factors of drilling under a safe roof are the main advantages of this method of drilling. Drilling and production costs are also favorable in comparison to the old methods of drilling by percussion drills.

TABLE 1. - Drilling data for the period January 1 through January 26, 1946

Based on drill rates (exclusive of overtime).. Explosives - 20¢ per lb.

Labor costs include drilling and blasting costs only

|                                   | Total<br>feet               | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot   | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|-----------------------------------|-----------------------------|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|------------------------------|------------------------------|----------------|
| BOYD MINE                         |                             |                                |                                       |                                |                                |                              |                              |                |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-2 & 3.....                   | 2,362                       | 52.5                           |                                       | 52.5                           | 0.152                          | 0.091                        | 0.243                        | 2,166          |
| Total.....                        | 2,362                       | 52.5                           |                                       | 52.5                           | .152                           | .091                         | .243                         | 2,166          |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 10N0-1, 2, 3.....              | 1,434                       | 35.0                           |                                       | 35.0                           | .222                           | .130                         | .352                         | 1,586          |
| DD 10S0-1, 2, 3, 4.....           | 2,030                       | 46.1                           |                                       | 46.1                           | .187                           | .134                         | .321                         | 3,246          |
| DD 10S2-1, 2.....                 | 2,233                       | 48.2                           |                                       | 48.2                           | .212                           | .122                         | .334                         | 6,519          |
| DD 10S3-2, 3-3.....               | 1,960                       | 40.6                           |                                       | 40.6                           | .199                           | .084                         | .283                         | 2,472          |
| DD 10S5-1, 5-3.....               | 1,995                       | 59.6                           |                                       | 59.6                           | .167                           | .112                         | .279                         | 4,318          |
| DD 10S6-1, 6-2.....               | 2,142                       | 49.8                           |                                       | 49.8                           | .157                           | .130                         | .287                         | 1,752          |
| DD 10S7-1, 7-3.....               | 2,168                       | 47.1                           |                                       | 47.1                           | .187                           | .126                         | .313                         | 3,816          |
| Total.....                        | 13,962                      | 46.2                           |                                       | 46.2                           | .189                           | .120                         | .309                         | 23,709         |
| Foot drilling, percussion drills  |                             |                                |                                       |                                |                                |                              |                              |                |
| 10S8-3.....                       | 3,568                       | 103.3                          | 40.1                                  | 74.3                           | .124                           | .087                         | .211                         | 1,320          |
| 10S8-2.....                       | 1,246                       | 112.0                          | 78.4                                  | 90.6                           | .095                           | .044                         | .139                         | 942            |
| Total.....                        | 4,814                       | 104.7                          | 51.0                                  | 78.0                           | .116                           | .076                         | .192                         | 2,262          |
| Grand total.....                  | 21,138                      | 51.8                           | 51.0                                  | 51.7                           | .168                           | .106                         | .275                         | 28,137         |
|                                   | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton    | Total<br>cost<br>per<br>ton           | Tons<br>per<br>lb.<br>expl.    | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings    | Total<br>ave.<br>earnings    |                |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-2 & 3.....                   | 0.166                       | 0.099                          | 0.265                                 | 2.024                          | 0.917                          | 8.00                         | 8.00                         |                |
| Total.....                        | .166                        | .099                           | .265                                  | 2.024                          | .917                           | 8.00                         | 8.00                         |                |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 10N0-1, 2, 3.....              | .201                        | .117                           | .318                                  | 1.707                          | 1.106                          | 7.77                         | 7.77                         |                |
| DD 10S0-1, 2, 3, 4.....           | .117                        | .084                           | .201                                  | 2.390                          | 1.599                          | 8.61                         | 8.61                         |                |
| DD 10S2-1, 2.....                 | .073                        | .042                           | .115                                  | 4.776                          | 2.919                          | 10.21                        | 10.21                        |                |
| DD 10S3-2, 3-3.....               | .158                        | .066                           | .224                                  | 3.018                          | 1.261                          | 8.07                         | 8.07                         |                |
| DD 10S5-1, 5-3.....               | .077                        | .052                           | .129                                  | 3.848                          | 2.164                          | 9.93                         | 9.93                         |                |
| DD 10S6-1, 6-2.....               | .192                        | .158                           | .350                                  | 1.262                          | .818                           | 7.82                         | 7.82                         |                |
| DD 10S7-1, 7-3.....               | .106                        | .071                           | .177                                  | 2.798                          | 1.760                          | 8.83                         | 8.83                         |                |
| Total.....                        | .111                        | .070                           | .181                                  | 2.841                          | 1.698                          | 8.27                         |                              |                |
| Foot drilling, percussion drills  |                             |                                |                                       |                                |                                |                              |                              |                |
| 10S8-3.....                       | .334                        | .236                           | .570                                  | .848                           | 0.370                          | 11.18                        | 9.19                         |                |
| 10S8-2.....                       | .126                        | .058                           | .184                                  | 3.463                          | .756                           | 11.76                        | 8.63                         |                |
| Total.....                        | .247                        | .162                           | .409                                  | 1.237                          | .470                           | 11.27                        | 9.07                         |                |
| Grand total.....                  | .126                        | .080                           | .206                                  | 2.502                          | 1.331                          | 8.85                         | 8.69                         |                |

Note - DD denotes diamond drill.

TABLE 2. - Drilling data for the period January 1 through January 26, 1946

Based on drill rates (exclusive of overtime). Explosives - 20¢ per lb.

Labor costs include drilling and blasting costs only

|                                          | Total<br>feet | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|------------------------------------------|---------------|--------------------------------|---------------------------------------|--------------------------------|------------------------------|------------------------------|------------------------------|----------------|
| <b>EUREKA MINE</b>                       |               |                                |                                       |                                |                              |                              |                              |                |
| <b>Bonus drilling, diamond drills</b>    |               |                                |                                       |                                |                              |                              |                              |                |
| DD 3N5-2.....                            | 1,235         | 44.1                           |                                       | 44.1                           | 0.216                        | 0.138                        | 0.354                        | 3,156          |
| DD 3S5.....                              | 347           | 21.7                           |                                       | 21.7                           | .455                         | .416                         | .870                         | 2,016          |
| DD 3S6.....                              | 361           | 20.2                           |                                       | 20.2                           | .433                         | .092                         | .525                         | 1,416          |
| Total.....                               | 1,943         | 31.4                           |                                       | 31.4                           | .299                         | .179                         | .478                         | 6,588          |
| <b>Bonus drilling, percussion drills</b> |               |                                |                                       |                                |                              |                              |                              |                |
| 3N1-2.....                               | 1,540         | 38.5                           |                                       | 38.5                           | .222                         | .089                         | .310                         | 2,814          |
| 3N0-4.....                               | 112           | 56.0                           |                                       | 56.0                           | .159                         | .089                         | .249                         | 174            |
| 3S0-20.....                              | 2,251         | 54.9                           |                                       | 54.9                           | .155                         | .084                         | .239                         | 2,856          |
| 3S1-20.....                              | 1,098         | 54.9                           |                                       | 54.9                           | .185                         | .086                         | .271                         | 2,784          |
| 3S4.....                                 | 1,214         | 31.9                           |                                       | 31.9                           | .288                         | .099                         | .387                         | 3,750          |
| 3S7.....                                 | 406           | 45.1                           |                                       | 45.1                           | .228                         | .112                         | .339                         | 1,284          |
| 3S8.....                                 | 1,180         | 38.1                           |                                       | 38.1                           | .217                         | .090                         | .308                         | 1,842          |
| 4N0.....                                 | 826           | 51.6                           |                                       | 51.6                           | .162                         | .082                         | .244                         | 1,020          |
| 4S4.....                                 | 1,208         | 40.9                           |                                       | 40.9                           | .210                         | .080                         | .290                         | 2,178          |
| Total.....                               | 9,835         | 43.4                           |                                       | 43.4                           | .203                         | .088                         | .291                         | 19,500         |
| Grand total.....                         | 11,778        | 40.8                           |                                       | 40.8                           | .219                         | .103                         | .322                         | 26,088         |

|                                          | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton | Total<br>cost<br>per<br>ton | Tons<br>per<br>lb.<br>expl. | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings | Total<br>ave.<br>earnings |
|------------------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|--------------------------------|---------------------------|---------------------------|
| <b>Bonus drilling, diamond drills</b>    |                             |                             |                             |                             |                                |                           |                           |
| DD 3N5-2.....                            | 0.085                       | 0.054                       | 0.139                       | 3.704                       | 2.555                          | 9.55                      | 9.55                      |
| DD 3S5.....                              | .078                        | .072                        | .150                        | 2.796                       | 5.810                          | 9.86                      | 9.86                      |
| DD 3S6.....                              | .110                        | .023                        | .133                        | 8.530                       | 3.922                          | 8.74                      | 8.74                      |
| Total.....                               | .088                        | .053                        | .141                        | 3.788                       | 3.391                          | 9.40                      | 9.40                      |
| <b>Bonus drilling, percussion drills</b> |                             |                             |                             |                             |                                |                           |                           |
| 3N1-2.....                               | .121                        | .048                        | .169                        | 4.126                       | 1.827                          | 8.53                      | 8.53                      |
| 3N0-4.....                               | .103                        | .057                        | .160                        | 3.480                       | 1.554                          | 8.93                      | 8.93                      |
| 3S0-20.....                              | .122                        | .066                        | .188                        | 3.032                       | 1.269                          | 8.51                      | 8.51                      |
| 3S1-20.....                              | .073                        | .034                        | .107                        | 5.923                       | 2.536                          | 10.18                     | 10.18                     |
| 3S4.....                                 | .093                        | .032                        | .125                        | 6.240                       | 3.089                          | 9.21                      | 9.21                      |
| 3S7.....                                 | .072                        | .035                        | .107                        | 5.656                       | 3.163                          | 10.26                     | 10.26                     |
| 3S8.....                                 | .139                        | .058                        | .197                        | 3.456                       | 1.561                          | 8.27                      | 8.27                      |
| 4N0.....                                 | .131                        | .067                        | .198                        | 3.000                       | 1.235                          | 8.37                      | 8.37                      |
| 4S4.....                                 | .117                        | .044                        | .161                        | 4.500                       | 1.803                          | 8.61                      | 8.61                      |
| Total.....                               | .102                        | .044                        | .147                        | 4.505                       | 1.983                          | 8.82                      | 8.82                      |
| Grand total.....                         | .099                        | .047                        | .145                        | 4,299                       | 2.215                          | 8.94                      | 8.94                      |

Note - DD denotes diamond drill.

TABLE 3. - Drilling data for the period January 28 through February 23, 1946

Based on drill rates (exclusive of overtime). Explosives - 17¢ per lb.

Labor costs include drilling and blasting costs only

|                                   | Total<br>feet | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|-----------------------------------|---------------|--------------------------------|---------------------------------------|--------------------------------|------------------------------|------------------------------|------------------------------|----------------|
| BOYD MINE                         |               |                                |                                       |                                |                              |                              |                              |                |
| Bonus drilling, percussion drills |               |                                |                                       |                                |                              |                              |                              |                |
| 10N1-2 & 3.....                   | 1,707         | 40.9                           |                                       | 40.9                           | 0.205                        | 0.100                        | 0.304                        | 2,664          |
| Total.....                        | 1,707         | 40.9                           |                                       | 40.9                           | .205                         | .100                         | .304                         | 2,664          |
| Bonus drilling, diamond drills    |               |                                |                                       |                                |                              |                              |                              |                |
| DD 10N01-2 & 3.....               | 1,286         | 35.5                           |                                       | 35.5                           | .258                         | .166                         | .424                         | 3,495          |
| DD 10S01-2-3 & 4.....             | 1,886         | 38.5                           |                                       | 38.5                           | .232                         | .133                         | .365                         | 4,196          |
| DD 10S2-1, 2-2.....               | 2,405         | 51.2                           |                                       | 51.2                           | .206                         | .123                         | .330                         | 7,272          |
| DD 10S3-2, 3-3.....               | 2,054         | 39.8                           |                                       | 39.8                           | .202                         | .102                         | .304                         | 2,550          |
| DD 10S5-1, 5-3.....               | 1,559         | 46.2                           |                                       | 46.2                           | .190                         | .113                         | .303                         | 2,724          |
| DD 10S6-1, 6-2.....               | 2,087         | 48.2                           |                                       | 48.2                           | .166                         | .093                         | .259                         | 2,184          |
| DD 10S7-1, 7-3.....               | 2,041         | 40.8                           |                                       | 40.8                           | .220                         | .105                         | .325                         | 4,458          |
| Total.....                        | 13,318        | 42.8                           |                                       | 42.8                           | .208                         | .117                         | .325                         | 26,879         |
| Foot drilling, percussion drills  |               |                                |                                       |                                |                              |                              |                              |                |
| 10S4-1, 4-2.....                  | 174           | 80.0                           | 17.9                                  | 27.8                           | .255                         | .087                         | .342                         | 250            |
| 10S8-3.....                       | 2,647         | 94.2                           | 32.8                                  | 56.3                           | .145                         | .078                         | .223                         | 2,089          |
| 10S8-2.....                       | 612           | 102.0                          | -                                     | 102.0                          | .105                         | .057                         | .162                         | 640            |
| Total.....                        | 3,433         | 95.5                           | 30.5                                  | 57.9                           | .143                         | .075                         | .218                         | 2,979          |
| Grand total.....                  | 18,458        | 46.1                           | 30.5                                  | 44.8                           | .196                         | .108                         | .303                         | 32,522         |

|                                   | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton | Total<br>cost<br>per<br>ton | Tons<br>per<br>lb.<br>expl. | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings | Total<br>ave.<br>earnings |
|-----------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|--------------------------------|---------------------------|---------------------------|
| Bonus drilling, percussion drills |                             |                             |                             |                             |                                |                           |                           |
| 10N1-2 & 3.....                   | 0.131                       | 0.064                       | 0.195                       | 2.661                       | 1.561                          | 8.37                      | 8.37                      |
| Total.....                        | .131                        | .064                        | .195                        | 2.661                       | 1.561                          | 8.37                      | 8.37                      |
| Bonus drilling, diamond drills    |                             |                             |                             |                             |                                |                           |                           |
| DD 10N01-2 & 3.....               | .095                        | .061                        | .156                        | 2.787                       | 2.718                          | 9.15                      | 9.15                      |
| DD 10S01-2-3 & 4.....             | .104                        | .060                        | .164                        | 2.835                       | 2.225                          | 8.92                      | 8.92                      |
| DD 10S2-1, 2-2.....               | .068                        | .041                        | .109                        | 4.167                       | 3.024                          | 10.55                     | 10.55                     |
| DD 10S3-2, 3-3.....               | .162                        | .082                        | .245                        | 2.066                       | 1.241                          | 8.03                      | 8.03                      |
| DD 10S5-1, 5-3.....               | .109                        | .065                        | .174                        | 2.624                       | 1.747                          | 8.78                      | 8.78                      |
| DD 10S6-1, 6-2.....               | .159                        | .089                        | .248                        | 1.907                       | 1.046                          | 8.06                      | 8.06                      |
| DD 10S7-1, 7-3.....               | .101                        | .048                        | .149                        | 3.530                       | 2.184                          | 8.98                      | 8.98                      |
| Total.....                        | .103                        | .058                        | .161                        | 2.935                       | 2.018                          | 8.89                      | 8.89                      |
| Foot drilling, percussion drills  |                             |                             |                             |                             |                                |                           |                           |
| 10S4-1, 4-2.....                  | .177                        | .061                        | .238                        | 2.809                       | 1.437                          | 8.40                      | 7.09                      |
| 10S8-3.....                       | .184                        | .099                        | .283                        | 1.709                       | .789                           | 10.30                     | 8.17                      |
| 10S8-2.....                       | .100                        | .054                        | .154                        | 3.137                       | 1.046                          | 10.71                     | 10.71                     |
| Total.....                        | .165                        | .086                        | .252                        | 1.966                       | .868                           | 10.32                     | 8.31                      |
| Grand total.....                  | .111                        | .061                        | .172                        | 2.786                       | 1.762                          | 8.95                      | 8.78                      |

Note - DD denotes diamond drill.

TABLE 4. - Drilling data for the period January 28 through February 23, 1946  
Based on drill rates (exclusive of overtime). Explosives - 17¢ per lb.  
Labor costs include drilling and blasting costs only

|                                          | Total<br>feet | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|------------------------------------------|---------------|--------------------------------|---------------------------------------|--------------------------------|------------------------------|------------------------------|------------------------------|----------------|
| <b>EUREKA MINE</b>                       |               |                                |                                       |                                |                              |                              |                              |                |
| <b>Bonus drilling, diamond drills</b>    |               |                                |                                       |                                |                              |                              |                              |                |
| DD 3N5-2.....                            | 1,179         | 40.0                           |                                       | 40.0                           | 0.179                        | 0.119                        | 0.298                        | 3,798          |
| DD 3S5.....                              | 581           | 28.7                           |                                       | 28.7                           | .325                         | .073                         | .398                         | 2,100          |
| DD 3S6.....                              | 468           | 52.0                           |                                       | 52.0                           | .209                         | .124                         | .333                         | 1,518          |
| Total.....                               | 2,228         | 37.9                           |                                       | 37.9                           | .223                         | .108                         | .332                         | 7,416          |
| <b>Bonus drilling, percussion drills</b> |               |                                |                                       |                                |                              |                              |                              |                |
| 3N1-2.....                               | 1,520         | 33.0                           |                                       | 33.0                           | .250                         | .103                         | .354                         | 2,736          |
| 3S0-20.....                              | 216           | 21.6                           |                                       | 21.6                           | .543                         | .118                         | .661                         | 2,034          |
| 3S1-20.....                              | 609           | 23.4                           |                                       | 23.4                           | .365                         | .101                         | .466                         | 1,842          |
| 3S4.....                                 | 1,484         | 35.3                           |                                       | 35.3                           | .265                         | .077                         | .342                         | 4,400          |
| 3S7.....                                 | 527           | 25.1                           |                                       | 25.1                           | .348                         | .091                         | .439                         | 1,650          |
| 3S8.....                                 | 916           | 35.2                           |                                       | 35.2                           | .233                         | .094                         | .327                         | 1,488          |
| 4N0.....                                 | 468           | 29.3                           |                                       | 29.3                           | .304                         | .055                         | .359                         | 1,374          |
| 4S4.....                                 | 1,100         | 40.0                           |                                       | 40.0                           | .239                         | .077                         | .316                         | 3,120          |
| Total.....                               | 6,840         | 31.9                           |                                       | 31.9                           | .280                         | .088                         | .368                         | 18,644         |
| Grand total.....                         | 9,068         | 33.2                           |                                       | 33.2                           | .266                         | .093                         | .359                         | 26,060         |

|                                          | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton | Total<br>cost<br>per<br>ton | Tons<br>per<br>lb.<br>expl. | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings | Total<br>ave,<br>earnings |
|------------------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|--------------------------------|---------------------------|---------------------------|
| <b>Bonus drilling, diamond drills</b>    |                             |                             |                             |                             |                                |                           |                           |
| DD 3N5-2.....                            | 0.056                       | 0.037                       | 0.093                       | 4.593                       | 3.221                          | 7.15                      | 7.15                      |
| DD 3S5.....                              | .090                        | .020                        | .110                        | 8.400                       | 3.614                          | 9.33                      | 9.33                      |
| DD 3S6.....                              | .065                        | .038                        | .103                        | 4.465                       | 3.244                          | 10.89                     | 10.89                     |
| Total.....                               | .067                        | .032                        | .100                        | 5.234                       | 3.329                          | 8.47                      | 8.47                      |
| <b>Bonus drilling, percussion drills</b> |                             |                             |                             |                             |                                |                           |                           |
| 3N1-2.....                               | .139                        | .058                        | .196                        | 2.961                       | 1.800                          | 8.27                      | 8.27                      |
| 3S0-20.....                              | .058                        | .013                        | .070                        | 13.56                       | 9.417                          | 11.72                     | 11.72                     |
| 3S1-20.....                              | .121                        | .033                        | .154                        | 5.088                       | 3.025                          | 8.54                      | 8.54                      |
| 3S4.....                                 | .089                        | .026                        | .115                        | 6.528                       | 2.965                          | 9.35                      | 9.35                      |
| 3S7.....                                 | .111                        | .029                        | .140                        | 5.828                       | 3.131                          | 8.73                      | 8.73                      |
| 3S8.....                                 | .144                        | .058                        | .202                        | 2.929                       | 1.625                          | 8.21                      | 8.21                      |
| 4N0.....                                 | .104                        | .019                        | .122                        | 9.099                       | 2.936                          | 8.90                      | 8.90                      |
| 4S4.....                                 | .084                        | .027                        | .112                        | 6.240                       | 2.836                          | 9.56                      | 9.56                      |
| Total.....                               | .103                        | .032                        | .135                        | 5.249                       | 2.726                          | 8.93                      | 8.93                      |
| Grand total.....                         | .093                        | .032                        | .125                        | 5.245                       | 2.874                          | 8.83                      | 8.83                      |

TABLE 5. - Drilling data for the period February 25 through March 23, 1946  
Based on drill rates (exclusive of overtime). Explosives - 17¢ per lb.  
Labor costs include drilling and blasting costs only

|                                   | Total<br>feet               | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot   | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|-----------------------------------|-----------------------------|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|------------------------------|------------------------------|----------------|
| BOYD MINE                         |                             |                                |                                       |                                |                                |                              |                              |                |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-2 & 3.....                   | 722                         | 50.7                           |                                       | 50.7                           | 0.212                          | 0.114                        | 0.326                        | 2,316          |
| Total.....                        | 722                         | 50.7                           |                                       | 50.7                           | .212                           | .114                         | .326                         | 2,316          |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 10N0-1-2 & 3.....              | 1,168                       | 42.1                           |                                       | 42.1                           | .220                           | .101                         | .321                         | 2,800          |
| DD 10S0-1-2-3 & 4.....            | 2,033                       | 44.2                           |                                       | 44.2                           | .223                           | .101                         | .324                         | 5,756          |
| DD 10S2-2, 2-2.....               | 1,765                       | 44.1                           |                                       | 44.1                           | .228                           | .103                         | .331                         | 5,376          |
| DD 10S3-2, 3-3.....               | 406                         | 33.8                           |                                       | 33.8                           | .289                           | .105                         | .394                         | 1,470          |
| DD 10S5-1, 5-3.....               | 2,264                       | 50.3                           |                                       | 50.3                           | .180                           | .086                         | .266                         | 4,162          |
| DD 10S6-3.....                    | 2,258                       | 49.6                           |                                       | 49.6                           | .178                           | .105                         | .282                         | 3,762          |
| DD 10S7-1.....                    | 2,277                       | 48.4                           |                                       | 48.4                           | .189                           | .101                         | .290                         | 4,558          |
| Total.....                        | 12,171                      | 46.2                           |                                       | 46.2                           | .203                           | .099                         | .302                         | 27,884         |
| Foot drilling, percussion drills  |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-1.....                       | 2,353                       | 106.9                          | 40.8                                  | 67.2                           | .128                           | .077                         | .205                         | 1,728          |
| 10S8-3.....                       | 1,902                       | 95.1                           | 19.7                                  | 44.2                           | .182                           | .080                         | .262                         | 1,854          |
| Total.....                        | 4,255                       | 101.0                          | 28.5                                  | 54.6                           | .152                           | .078                         | .231                         | 3,582          |
| Grand total.....                  | 17,148                      | 51.5                           | 28.5                                  | 48.2                           | .191                           | .095                         | .285                         | 33,782         |
|                                   | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton    | Total<br>cost<br>per<br>ton           | Tons<br>per<br>lb.<br>expl.    | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings    | Total<br>ave.<br>earnings    |                |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-2 & 3.....                   | 0.066                       | 0.036                          | 0.102                                 | 4.775                          | 3.208                          | 10.74                        | 10.74                        |                |
| Total.....                        | .066                        | .036                           | .102                                  | 4.775                          | 3.208                          | 10.74                        | 10.74                        |                |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 10N0-1-2 & 3.....              | .092                        | .042                           | .134                                  | 4.040                          | 2.397                          | 9.26                         | 9.26                         |                |
| DD 10S0-1-2-3 & 4.....            | .079                        | .036                           | .114                                  | 4.773                          | 2.831                          | 9.84                         | 9.84                         |                |
| DD 10S2-2, 2-2.....               | .075                        | .034                           | .109                                  | 5.038                          | 3.046                          | 10.07                        | 10.07                        |                |
| DD 10S3-2, 3-3.....               | .080                        | .029                           | .109                                  | 5.880                          | 3.621                          | 9.78                         | 9.78                         |                |
| DD 10S5-1, 5-3.....               | .098                        | .047                           | .145                                  | 3.622                          | 1.838                          | 9.06                         | 9.06                         |                |
| DD 10S6-3.....                    | .107                        | .063                           | .170                                  | 2.706                          | 1.666                          | 8.82                         | 8.82                         |                |
| DD 10S7-1.....                    | .095                        | .051                           | .145                                  | 3.361                          | 2.002                          | 9.17                         | 9.17                         |                |
| Total.....                        | .089                        | .043                           | .132                                  | 3.921                          | 2.291                          | 9.42                         | 9.42                         |                |
| Foot drilling, percussion drills  |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-1.....                       | .174                        | .105                           | .279                                  | 1.624                          | 0.734                          | 11.23                        | 8.59                         |                |
| 10S8-3.....                       | .187                        | .083                           | .269                                  | 2.060                          | 0.975                          | 10.55                        | 8.05                         |                |
| Total.....                        | .181                        | .093                           | .274                                  | 1.824                          | 0.842                          | 10.89                        | 8.29                         |                |
| Grand total.....                  | .097                        | .048                           | .145                                  | 3.534                          | 1.970                          | 9.58                         | 9.20                         |                |

TABLE 6. - Drilling data for the period February 25 through March 23, 1946

Based on drill rates (exclusive of overtime). Explosives - 17¢ per lb.

Labor costs include drilling and blasting costs only

|                                   | Total<br>feet               | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot   | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|-----------------------------------|-----------------------------|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|------------------------------|------------------------------|----------------|
| <b>EUREKA MINE</b>                |                             |                                |                                       |                                |                                |                              |                              |                |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 3N5-2.....                     | 1,183                       | 42.3                           |                                       | 42.3                           | 0.252                          | 0.108                        | 0.360                        | 4,454          |
| DD 3S5-6.....                     | 1,221                       | 41.4                           |                                       | 41.4                           | .249                           | .048                         | .297                         | 4,236          |
| Total.....                        | 2,404                       | 41.8                           |                                       | 41.8                           | .250                           | .078                         | .328                         | 8,690          |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 3N1-2.....                        | 1,059                       | 29.8                           |                                       | 29.8                           | .296                           | .072                         | .368                         | 2,952          |
| 3S0-20.....                       | 384                         | 30.7                           |                                       | 30.7                           | .377                           | .058                         | .435                         | 2,476          |
| 3S1-20.....                       | 436                         | 19.0                           |                                       | 19.0                           | .489                           | .168                         | .658                         | 2,334          |
| 3S4.....                          | 1,369                       | 31.1                           |                                       | 31.1                           | .312                           | .015                         | .417                         | 5,254          |
| 3S7.....                          | 797                         | 29.5                           |                                       | 29.5                           | .299                           | .111                         | .410                         | 2,241          |
| 3S8.....                          | 408                         | 29.1                           |                                       | 29.1                           | .276                           | .075                         | .351                         | 698            |
| 4N0.....                          | 348                         | 43.5                           |                                       | 43.5                           | .204                           | .072                         | .276                         | 678            |
| 4S4.....                          | 515                         | 27.1                           |                                       | 27.1                           | .286                           | .105                         | .391                         | 726            |
| Total.....                        | 5,316                       | 29.0                           |                                       | 29.0                           | .314                           | .097                         | .410                         | 17,359         |
| Grand total.....                  | 7,720                       | 32.1                           |                                       | 32.1                           | .294                           | .091                         | .385                         | 26,049         |
|                                   | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton    | Total<br>cost<br>per<br>ton           | Tons<br>per<br>lb.<br>expl.    | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings    | Total<br>ave.<br>earnings    |                |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 3N5-2.....                     | 0.069                       | 0.029                          | 0.096                                 | 5.939                          | 3.765                          | 10.66                        | 10.66                        |                |
| DD 3S5-6.....                     | .072                        | .014                           | .086                                  | 12.10                          | 3.469                          | 10.29                        | 10.29                        |                |
| Total.....                        | .069                        | .022                           | .091                                  | 7.900                          | 3.615                          | 10.47                        | 10.47                        |                |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 3N1-2.....                        | .106                        | .026                           | .132                                  | 6.560                          | 2.788                          | 8.84                         | 8.84                         |                |
| 3S0-20.....                       | .059                        | .009                           | .067                                  | 19.05                          | 6.448                          | 11.59                        | 11.59                        |                |
| 3S1-20.....                       | .091                        | .031                           | .123                                  | 5.403                          | 5.353                          | 9.28                         | 9.28                         |                |
| 3S4.....                          | .081                        | .027                           | .109                                  | 6.233                          | 3.838                          | 9.71                         | 9.71                         |                |
| 3S7.....                          | .106                        | .040                           | .146                                  | 4.301                          | 2.811                          | 8.83                         | 8.83                         |                |
| 3S8.....                          | .161                        | .044                           | .205                                  | 3.878                          | 1.711                          | 8.04                         | 8.04                         |                |
| 4N0.....                          | .105                        | .037                           | .142                                  | 4.581                          | 1.948                          | 8.87                         | 8.87                         |                |
| 4S4.....                          | .203                        | .074                           | .277                                  | 2.283                          | 1.410                          | 7.76                         | 7.76                         |                |
| Total.....                        | .096                        | .030                           | .126                                  | 5.744                          | 3.265                          | 9.12                         | 9.12                         |                |
| Grand total.....                  | .087                        | .027                           | .114                                  | 6.320                          | 3.374                          | 9.46                         | 9.46                         |                |

TABLE 7. - Drilling data for the period March 25 through April 20, 1946

Based on drill rates (exclusive of overtime). Explosives - 17¢ per lb.

Labor costs include drilling and blasting costs only

|                                   | Total<br>feet               | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot   | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|-----------------------------------|-----------------------------|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|------------------------------|------------------------------|----------------|
| BOYD MINE                         |                             |                                |                                       |                                |                                |                              |                              |                |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 10S0-2 & 3.....                   | 1,622                       | 50.7                           |                                       | 50.7                           | 0.190                          | 0.101                        | 0.291                        | 3,744          |
| Total.....                        | 1,622                       | 50.7                           |                                       | 50.7                           | .190                           | .101                         | .291                         | 3,744          |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 10N0-2 & 3.....                | 1,644                       | 51.4                           |                                       | 51.4                           | .190                           | .107                         | .297                         | 3,881          |
| DD 10S2-1 & 2.....                | 1,902                       | 50.1                           |                                       | 50.1                           | .217                           | .102                         | .319                         | 6,366          |
| DD 10S5-1 & 5-3.....              | 2,680                       | 60.9                           |                                       | 60.9                           | .163                           | .082                         | .245                         | 5,670          |
| DD 10S6-3.....                    | 1,412                       | 50.4                           |                                       | 50.4                           | .166                           | .098                         | .264                         | 1,769          |
| DD 10S7-1.....                    | 1,978                       | 43.0                           |                                       | 43.0                           | .210                           | .085                         | .296                         | 4,236          |
| Total.....                        | 9,616                       | 51.2                           |                                       | 51.2                           | .188                           | .093                         | .281                         | 21,922         |
| Foot drilling, percussion drills  |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-2 & 3.....                   | 1,654                       | 118.1                          | -                                     | 118.1                          | .105                           | .076                         | .181                         | 1,922          |
| 10N1-1.....                       | 1,472                       | 101.0                          | 43.3                                  | 81.8                           | .112                           | .051                         | .163                         | 1,034          |
| 10S8-3.....                       | 2,244                       | 93.1                           | 32.6                                  | 54.7                           | .147                           | .075                         | .223                         | 2,562          |
| Total.....                        | 5,370                       | 104.0                          | 34.6                                  | 73.6                           | .125                           | .069                         | .134                         | 5,518          |
| Grand total.....                  | 16,608                      | 59.4                           | 34.6                                  | 56.7                           | .168                           | .086                         | .254                         | 31,184         |
|                                   | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton    | Total<br>cost<br>per<br>ton           | Tons<br>per<br>lb.<br>expl.    | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings    | Total<br>ave.<br>earnings    |                |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 10S0-2 & 3.....                   | 0.082                       | 0.044                          | 0.126                                 | 3.90                           | 2.31                           | 9.65                         | 9.65                         |                |
| Total.....                        | .082                        | .044                           | .126                                  | 3.90                           | 2.31                           | 9.65                         | 9.65                         |                |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 10N0-2 & 3.....                | .080                        | .045                           | .126                                  | 3.75                           | 2.36                           | 9.75                         | 9.75                         |                |
| DD 10S2-1 & 2.....                | .065                        | .030                           | .095                                  | 5.59                           | 3.35                           | 10.86                        | 10.86                        |                |
| DD 10S5-1 & 5-3.....              | .077                        | .039                           | .116                                  | 4.41                           | 2.12                           | 9.93                         | 9.93                         |                |
| DD 10S6-3.....                    | .132                        | .079                           | .211                                  | 2.16                           | 1.25                           | 8.36                         | 8.36                         |                |
| DD 10S7-1.....                    | .098                        | .040                           | .138                                  | 4.27                           | 2.14                           | 9.05                         | 9.05                         |                |
| Total.....                        | .083                        | .041                           | .124                                  | 4.16                           | 2.28                           | 9.59                         | 9.59                         |                |
| Foot drilling, percussion drills  |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-2 & 3.....                   | .090                        | .066                           | .156                                  | 2.59                           | 1.16                           | 12.41                        | 12.41                        |                |
| 10N1-1.....                       | .159                        | .073                           | .232                                  | 2.32                           | .70                            | 10.28                        | 9.13                         |                |
| 10S8-3.....                       | .129                        | .066                           | .195                                  | 2.58                           | 1.14                           | 10.18                        | 8.06                         |                |
| Total.....                        | .121                        | .067                           | .188                                  | 2.53                           | 1.03                           | 10.97                        | 9.16                         |                |
| Grand total.....                  | .089                        | .046                           | .135                                  | 3.71                           | 1.88                           | 9.85                         | 9.52                         |                |

TABLE 8. - Drilling data for the period March 24 through April 20, 1946

Based on drill rates (exclusive of overtime). Explosives - 17¢ per lb.

Labor costs include drilling and blasting costs only

|                                   | Total<br>feet               | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot   | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|-----------------------------------|-----------------------------|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|------------------------------|------------------------------|----------------|
| EUREKA MINE                       |                             |                                |                                       |                                |                                |                              |                              |                |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 3N5-2.....                     | 965                         | 29.2                           |                                       | 29.2                           | 0.339                          | 0.134                        | 0.473                        | 4,218          |
| DD 3S5-6.....                     | 938                         | 29.3                           |                                       | 29.3                           | .318                           | .099                         | .417                         | 3,294          |
| DD 3S1-20.....                    | 1,039                       | 30.4                           |                                       | 30.4                           | .316                           | .093                         | .409                         | 3,944          |
| DD 3S7-8.....                     | 510                         | 23.4                           |                                       | 23.4                           | .477                           | .097                         | .574                         | 3,936          |
| DD 4S4.....                       | 732                         | 46.5                           |                                       | 46.5                           | .172                           | .068                         | .240                         | 756            |
| Total.....                        | 4,184                       | 30.6                           |                                       | 30.6                           | .316                           | .100                         | .416                         | 16,148         |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 3N1-2.....                        | 1,461                       | 32.5                           |                                       | 32.5                           | .269                           | .097                         | .366                         | 3,522          |
| 3S4.....                          | 1,274                       | 33.5                           |                                       | 33.5                           | .266                           | .080                         | .346                         | 3,306          |
| 4N0.....                          | 310                         | 51.7                           |                                       | 51.7                           | .209                           | .081                         | .290                         | 990            |
| Total.....                        | 3,045                       | 34.2                           |                                       | 34.2                           | .262                           | .088                         | .350                         | 7,818          |
| Grand total.....                  | 7,229                       | 32.0                           |                                       | 32.0                           | .293                           | .095                         | .388                         | 23,966         |
|                                   | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton    | Total<br>cost<br>per<br>ton           | Tons<br>per<br>lb.<br>expl.    | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings    | Total<br>ave.<br>earnings    |                |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 3N5-2.....                     | 0.078                       | 0.031                          | 0.108                                 | 5.55                           | 4.37                           | 9.91                         | 9.91                         |                |
| DD 3S5-6.....                     | .090                        | .028                           | .119                                  | 6.03                           | 3.51                           | 9.34                         | 9.34                         |                |
| DD 3S1-20.....                    | .083                        | .024                           | .108                                  | 6.94                           | 3.80                           | 9.61                         | 9.61                         |                |
| DD 3S7-8.....                     | .062                        | .013                           | .074                                  | 13.57                          | 7.72                           | 11.18                        | 11.18                        |                |
| DD 4S4.....                       | .166                        | .066                           | .232                                  | 2.59                           | 1.03                           | 7.99                         | 7.99                         |                |
| Total.....                        | .082                        | .026                           | .108                                  | 6.57                           | 3.86                           | 9.68                         | 9.68                         |                |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 3N1-2.....                        | .111                        | .040                           | .152                                  | 4.22                           | 2.41                           | 8.72                         | 8.72                         |                |
| 3S4.....                          | .103                        | .031                           | .133                                  | 5.52                           | 2.59                           | 8.93                         | 8.93                         |                |
| 4N0.....                          | .065                        | .025                           | .091                                  | 6.69                           | 3.19                           | 10.80                        | 10.80                        |                |
| Total.....                        | .102                        | .034                           | .136                                  | 4.94                           | 2.57                           | 8.95                         | 8.95                         |                |
| Grand total.....                  | .088                        | .029                           | .117                                  | 5.94                           | 3.32                           | 9.39                         | 9.39                         |                |

TABLE 9. - Drilling data for the period April 22 through May 18, 1946

Based on drill rates (exclusive of overtime). Explosives - 17¢ per lb.

Labor costs include drilling and blasting costs only

|                                  | Total<br>feet               | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot   | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|----------------------------------|-----------------------------|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|------------------------------|------------------------------|----------------|
| BOYD MINE                        |                             |                                |                                       |                                |                                |                              |                              |                |
| Bonus drilling, diamond drills   |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 10N0-1, 2 & 3.....            | 1,900                       | 52.8                           |                                       | 52.8                           | 0.188                          | 0.075                        | 0.263                        | 4,626          |
| DD 10S0-1, 2 & 3.....            | 1,722                       | 45.3                           |                                       | 45.3                           | .193                           | .090                         | .283                         | 3,016          |
| DD 10S2-1, 2.....                | 1,096                       | 39.1                           |                                       | 39.1                           | .251                           | .092                         | .343                         | 3,486          |
| DD 10S3-2, 3.....                | 618                         | 77.3                           |                                       | 77.3                           | .140                           | .024                         | .164                         | 1,324          |
| DD 10S5-1, 3.....                | 2,536                       | 72.5                           |                                       | 72.5                           | .138                           | .079                         | .217                         | 4,572          |
| DD 10S6-1, 3.....                | 2,784                       | 56.8                           |                                       | 56.8                           | .172                           | .081                         | .252                         | 5,946          |
| DD 10S7-1.....                   | 2,202                       | 47.9                           |                                       | 47.9                           | .189                           | .084                         | .273                         | 4,260          |
| Total.....                       | 12,858                      | 53.1                           |                                       | 53.1                           | .178                           | .079                         | .258                         | 27,230         |
| Foot drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-1, 2 & 3.....               | 1,756                       | 90.4                           | 67.3                                  | 76.3                           | .103                           | .071                         | .175                         | 2,822          |
| 10S8-2 & 3.....                  | 3,737                       | 102.0                          | 66.8                                  | 87.4                           | .105                           | .070                         | .175                         | 2,566          |
| Total.....                       | 5,493                       | 99.0                           | 67.0                                  | 83.5                           | .104                           | .071                         | .175                         | 5,388          |
| Grand total.....                 | 18,351                      | 59.2                           | 67.0                                  | 60.0                           | .156                           | .077                         | .233                         | 32,618         |
|                                  | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton    | Total<br>cost<br>per<br>ton           | Tons<br>per<br>lb.<br>expl.    | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings    | Total<br>ave.<br>earnings    |                |
| Bonus drilling, diamond drills   |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 10N0-1, 2 & 3.....            | 0.077                       | 0.031                          | 0.108                                 | 5.52                           | 2.43                           | 9.92                         | 9.92                         |                |
| DD 10S0-1, 2 & 3.....            | .110                        | .052                           | .162                                  | 3.30                           | 1.75                           | 8.74                         | 8.74                         |                |
| DD 10S2-1, 2.....                | .079                        | .029                           | .108                                  | 5.87                           | 3.18                           | 9.83                         | 9.83                         |                |
| DD 10S3-2, 3.....                | .065                        | .011                           | .076                                  | 15.40                          | 2.14                           | 10.81                        | 10.81                        |                |
| DD 10S5-1, 3.....                | .076                        | .044                           | .120                                  | 3.88                           | 1.80                           | 9.98                         | 9.98                         |                |
| DD 10S6-1, 3.....                | .080                        | .038                           | .118                                  | 4.50                           | 2.14                           | 9.75                         | 9.75                         |                |
| DD 10S7-1.....                   | .098                        | .043                           | .141                                  | 3.94                           | 1.93                           | 9.06                         | 9.06                         |                |
| Total.....                       | .084                        | .038                           | .122                                  | 4.53                           | 2.12                           | 9.56                         | 9.56                         |                |
| Foot drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-1, 2 & 3.....               | .064                        | .044                           | .109                                  | 3.82                           | 1.61                           | 9.50                         | 7.88                         |                |
| 10S8-2 & 3.....                  | .153                        | .102                           | .255                                  | 1.66                           | .69                            | 10.84                        | 9.18                         |                |
| Total.....                       | .106                        | .072                           | .178                                  | 2.36                           | .98                            | 10.48                        | 8.72                         |                |
| Grand total.....                 | .088                        | .043                           | .131                                  | 3.93                           | 1.78                           | 9.68                         | 9.38                         |                |

TABLE 10. - Drilling data for the period April 22 through May 18, 1946

Based on drill rates (exclusive of overtime). Explosives - 17¢ per lb.

Labor costs include drilling and blasting costs only

|                                          | Total<br>feet | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|------------------------------------------|---------------|--------------------------------|---------------------------------------|--------------------------------|------------------------------|------------------------------|------------------------------|----------------|
| <b>EUREKA MINE</b>                       |               |                                |                                       |                                |                              |                              |                              |                |
| <b>Bonus drilling, diamond drills</b>    |               |                                |                                       |                                |                              |                              |                              |                |
| DD 3N5-2.....                            | 1,307         | 33.5                           |                                       | 33.5                           | 0.291                        | 0.095                        | 0.385                        | 4,728          |
| DD 3S5-6.....                            | 1,331         | 24.9                           |                                       | 24.9                           | .355                         | .108                         | .463                         | 4,456          |
| DD 3S1-20.....                           | 940           | 43.7                           |                                       | 43.7                           | .236                         | .003                         | .239                         | 3,126          |
| DD 3S7-8.....                            | 1,544         | 35.1                           |                                       | 35.1                           | .267                         | .086                         | .353                         | 4,638          |
| DD 4S4.....                              | 1,112         | 50.5                           |                                       | 50.5                           | .173                         | .079                         | .252                         | 1,746          |
| Total.....                               | 6,234         | 34.6                           |                                       | 34.6                           | .269                         | .079                         | .348                         | 18,694         |
| <b>Bonus drilling, percussion drills</b> |               |                                |                                       |                                |                              |                              |                              |                |
| 3N1-2.....                               | 1,213         | 30.3                           |                                       | 30.3                           | .289                         | .114                         | .403                         | 3,210          |
| 3S4.....                                 | 513           | 32.1                           |                                       | 32.1                           | .309                         | .086                         | .395                         | 2,040          |
| 4NO.....                                 | 518           | 46.0                           |                                       | 46.0                           | .235                         | .130                         | .365                         | 1,866          |
| Total.....                               | 2,244         | 33.4                           |                                       | 33.4                           | .281                         | .111                         | .392                         | 7,116          |
| <b>Grand total.....</b>                  | <b>8,478</b>  | <b>34.3</b>                    |                                       | <b>34.3</b>                    | <b>.273</b>                  | <b>.087</b>                  | <b>.360</b>                  | <b>25,810</b>  |

|                                          | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton | Total<br>cost<br>per<br>ton | Tons<br>per<br>lb.<br>expl. | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings | Total<br>ave.<br>earnings |
|------------------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|--------------------------------|---------------------------|---------------------------|
| <b>Bonus drilling, diamond drills</b>    |                             |                             |                             |                             |                                |                           |                           |
| DD 3N5-2.....                            | 0.080                       | 0.026                       | 0.107                       | 6.50                        | 3.62                           | 9.75                      | 9.75                      |
| DD 3S5-6.....                            | .106                        | .032                        | .138                        | 5.29                        | 3.35                           | 8.84                      | 8.84                      |
| DD 3S1-20.....                           | .071                        | .001                        | .072                        | 3.7                         | 3.33                           | 10.33                     | 10.33                     |
| DD 3S7-8.....                            | .089                        | .028                        | .117                        | 5.97                        | 3.00                           | 9.37                      | 9.37                      |
| DD 4S4.....                              | .110                        | .050                        | .161                        | 3.37                        | 1.57                           | 8.74                      | 8.74                      |
| Total.....                               | .090                        | .026                        | .116                        | 6.48                        | 3.00                           | 9.33                      | 9.33                      |
| <b>Bonus drilling, percussion drills</b> |                             |                             |                             |                             |                                |                           |                           |
| 3N1-2.....                               | .109                        | .043                        | .152                        | 3.95                        | 2.65                           | 8.77                      | 8.77                      |
| 3S4.....                                 | .078                        | .022                        | .099                        | 7.88                        | 3.98                           | 9.90                      | 9.90                      |
| 4NO.....                                 | .065                        | .036                        | .101                        | 4.72                        | 3.60                           | 10.82                     | 10.82                     |
| Total.....                               | .089                        | .035                        | .124                        | 4.85                        | 3.17                           | 9.38                      | 9.38                      |
| <b>Grand total.....</b>                  | <b>.090</b>                 | <b>.029</b>                 | <b>.118</b>                 | <b>5.93</b>                 | <b>3.04</b>                    | <b>9.35</b>               | <b>9.35</b>               |

TABLE 11. - Drilling data for the period May 20 through June 15, 1946

Based on drill rates (exclusive of overtime). Explosives - 17¢ per lb.

Labor costs include drilling and blasting costs only

|                                         | Total<br>feet               | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot   | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|-----------------------------------------|-----------------------------|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|------------------------------|------------------------------|----------------|
| <b>BOYD MINE</b>                        |                             |                                |                                       |                                |                                |                              |                              |                |
| <u>Bonus drilling, diamond drills</u>   |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 10N0-1-2 & 3.....                    | 1,901                       | 51.4                           |                                       | 51.4                           | 0.186                          | 0.068                        | 0.254                        | 2,990          |
| DD 10S0-2 & 3.....                      | 1,592                       | 40.8                           |                                       | 40.8                           | .219                           | .087                         | .307                         | 2,142          |
| DD 10S2-2 & 3.....                      | 730                         | 60.8                           |                                       | 60.8                           | .236                           | .097                         | .333                         | 3,356          |
| DD 10S3-1-2 & 3.....                    | 1,401                       | 53.9                           |                                       | 53.9                           | .204                           | .087                         | .291                         | 3,636          |
| DD 10S5-1 & 6-1.....                    | 1,198                       | 43.0                           |                                       | 43.0                           | .252                           | .090                         | .342                         | 3,690          |
| DD 10S5-3 & 6-3.....                    | 2,958                       | 65.7                           |                                       | 65.7                           | .162                           | .079                         | .241                         | 5,580          |
| DD 10S7-1.....                          | 1,242                       | 37.6                           |                                       | 37.6                           | .276                           | .114                         | .390                         | 3,762          |
| Total.....                              | 11,022                      | 50.1                           |                                       | 50.1                           | .207                           | .086                         | .293                         | 25,156         |
| <u>Foot drilling, percussion drills</u> |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-2-3.....                           | 1,320                       | 97.2                           | 49.0                                  | 84.5                           | .120                           | .040                         | .160                         | 2,837          |
| 10S8-2 & 3.....                         | 3,840                       | 103.9                          | 48.9                                  | 81.7                           | .126                           | .079                         | .205                         | 3,878          |
| Total.....                              | 5,160                       | 102.0                          | 49.0                                  | 82.5                           | .124                           | .069                         | .193                         | 6,715          |
| Grand total.....                        | 16,182                      | 58.0                           | 49.0                                  | 57.3                           | .181                           | .080                         | .261                         | 31,871         |
|                                         | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton    | Total<br>cost<br>per<br>ton           | Tons<br>per<br>lb.<br>expl.    | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings    | Total<br>ave.<br>earnings    |                |
| <u>Bonus drilling, diamond drills</u>   |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 10N0-1-2 & 3.....                    | 0.119                       | 0.043                          | 0.162                                 | 3.94                           | 1.57                           | 9.58                         | 9.58                         |                |
| DD 10S0-2 & 3.....                      | .163                        | .065                           | .228                                  | 2.63                           | 1.35                           | 8.96                         | 8.96                         |                |
| DD 10S2-2 & 3.....                      | .051                        | .021                           | .072                                  | 8.03                           | 4.60                           | 14.35                        | 14.35                        |                |
| DD 10S3-1-2 & 3.....                    | .079                        | .034                           | .112                                  | 5.06                           | 2.60                           | 11.00                        | 11.00                        |                |
| DD 10S5-1 & 6-1.....                    | .082                        | .029                           | .111                                  | 5.80                           | 3.08                           | 10.82                        | 10.82                        |                |
| DD 10S5-3 & 6-3.....                    | .086                        | .042                           | .128                                  | 4.06                           | 1.89                           | 10.62                        | 10.62                        |                |
| DD 10S7-1.....                          | .091                        | .038                           | .129                                  | 4.50                           | 3.03                           | 10.38                        | 10.38                        |                |
| Total.....                              | .091                        | .038                           | .128                                  | 4.53                           | 3.03                           | 10.39                        | 10.39                        |                |
| <u>Foot drilling, percussion drills</u> |                             |                                |                                       |                                |                                |                              |                              |                |
| 10N1-2-3.....                           | .056                        | .019                           | .074                                  | 9.15                           | 2.15                           | 10.99                        | 10.10                        |                |
| 10S8-2 & 3.....                         | .125                        | .079                           | .203                                  | 2.16                           | 1.01                           | 12.07                        | 12.07                        |                |
| Total.....                              | .095                        | .053                           | .148                                  | 3.19                           | 1.30                           | 11.75                        | 11.75                        |                |
| Grand total.....                        | .092                        | .041                           | .133                                  | 4.16                           | 1.97                           | 10.59                        | 10.59                        |                |

TABLE 12. - Drilling data for the period May 20 through June 15 1946

Based on drill rates (exclusive of overtime). Explosives - 17¢ per lb.

Labor costs include drilling and blasting costs only

|                                   | Total<br>feet               | Feet<br>per<br>shift,<br>cont. | Feet<br>per<br>shift,<br>co.<br>acct. | Feet<br>per<br>shift,<br>total | Labor<br>cost<br>per<br>foot   | Expl.<br>cost<br>per<br>foot | Total<br>cost<br>per<br>foot | Tons<br>broken |
|-----------------------------------|-----------------------------|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|------------------------------|------------------------------|----------------|
| <b>EUREKA MINE</b>                |                             |                                |                                       |                                |                                |                              |                              |                |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 3N5-2.....                     | 1,174                       | 36.7                           |                                       | 36.7                           | 0.256                          | 0.069                        | 0.325                        | 2,320          |
| DD 3N1-2.....                     | 942                         | 25.5                           |                                       | 25.5                           | .394                           | .099                         | .493                         | 3,686          |
| DD 3S0-20 & 1-20.....             | 355                         | 23.3                           |                                       | 23.3                           | .537                           | .223                         | .760                         | 3,084          |
| DD 3S5.....                       | 1,044                       | 45.4                           |                                       | 45.4                           | .252                           | .077                         | .329                         | 3,654          |
| DD 3S6.....                       | 1,435                       | 34.5                           |                                       | 34.5                           | .268                           | .116                         | .384                         | 2,790          |
| DD 3S7 & 8.....                   | 1,700                       | 37.0                           |                                       | 37.0                           | .268                           | .079                         | .347                         | 4,312          |
| DD 4N0 & 4S4.....                 | 831                         | 32.9                           |                                       | 32.9                           | .324                           | .109                         | .433                         | 3,164          |
| Total.....                        | 7,481                       | 34.0                           |                                       | 34.0                           | .299                           | .097                         | .396                         | 23,010         |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 3S4.....                          | 760                         | 42.2                           |                                       | 42.2                           | .271                           | .089                         | .360                         | 2,844          |
| Total.....                        | 760                         | 42.2                           |                                       | 42.2                           | .271                           | .089                         | .360                         | 2,844          |
| Grand total.....                  | 8,241                       | 34.6                           |                                       | 34.6                           | .296                           | .096                         | .392                         | 25,854         |
|                                   | Labor<br>cost<br>per<br>ton | Expl.<br>cost<br>per<br>ton    | Total<br>cost<br>per<br>ton           | Tons<br>per<br>lb.<br>expl.    | Tons<br>per<br>foot<br>drilled | Ave.<br>cont.<br>earnings    | Total<br>ave.<br>earnings    |                |
| Bonus drilling, diamond drills    |                             |                                |                                       |                                |                                |                              |                              |                |
| DD 3N5-2.....                     | 0.129                       | 0.035                          | 0.164                                 | 4.84                           | 1.98                           | 9.38                         | 9.38                         |                |
| DD 3N1-2.....                     | .101                        | .025                           | .126                                  | 6.75                           | 3.91                           | 10.03                        | 10.03                        |                |
| DD 3S0-20 & 1-20.....             | .062                        | .026                           | .087                                  | 6.62                           | 8.69                           | 12.49                        | 12.49                        |                |
| DD 3S5.....                       | .072                        | .022                           | .094                                  | 7.74                           | 3.50                           | 11.45                        | 11.45                        |                |
| DD 3S6.....                       | .138                        | .060                           | .198                                  | 2.86                           | 1.94                           | 9.25                         | 9.25                         |                |
| DD 3S7 & 8.....                   | .106                        | .031                           | .137                                  | 5.43                           | 2.54                           | 9.89                         | 9.89                         |                |
| DD 4N0 & 4S4.....                 | .085                        | .029                           | .114                                  | 5.95                           | 3.81                           | 10.65                        | 10.65                        |                |
| Total.....                        | .097                        | .032                           | .129                                  | 5.39                           | 3.08                           | 10.15                        | 10.15                        |                |
| Bonus drilling, percussion drills |                             |                                |                                       |                                |                                |                              |                              |                |
| 3S4.....                          | .072                        | .024                           | .098                                  | 7.11                           | 3.74                           | 11.43                        | 11.43                        |                |
| Total.....                        | .072                        | .024                           | .098                                  | 7.11                           | 3.74                           | 11.43                        | 11.43                        |                |
| Grand total.....                  | .094                        | .031                           | .125                                  | 5.54                           | 3.14                           | 10.25                        | 10.25                        |                |